

National Academies' Review of the  
NIOSH Construction Research Program  
**Goal 2: Reduce overexposures and  
illnesses**

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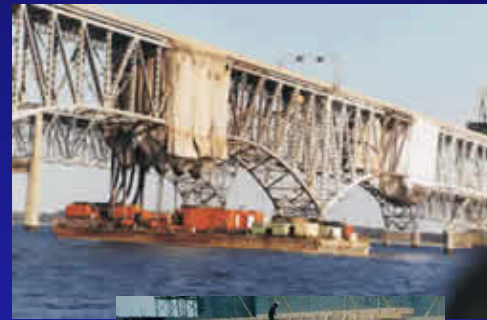
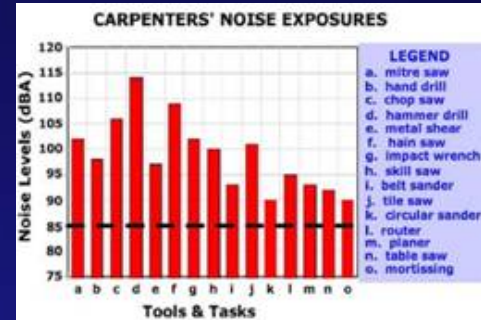


WORKPLACE SAFETY AND HEALTH



# Goal 2: Reduce Overexposures and Illnesses

- Sub-goal 2.1: Reduce noise exposures and hearing loss
- Sub-goal 2.2: Reduce lead exposure and various health effects (**focus area**)
- Sub-goal 2.3: Reduce silica exposure and silicosis



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# Goal 2: Reduce overexposures and illnesses

- Sub-goal 2.4: Reduce asphalt fume exposures and health effects  
(focus area)
- Sub-goal 2.5: Reduce dermal exposures and various skin disorders
- Sub-goal 2.6: Reduce welding fume exposures and various health effects



WORKPLACE SAFETY AND HEALTH



# Issues

- Noise induced hearing loss (NIHL) is endemic among construction workers - hearing loss averages from 60 to 80% based on trade. (3.5x higher than other industries)
- NIOSH state level surveillance in the 1980s showed that construction had the highest proportion of workers with blood lead levels (BLLs) over 70 ug/dl (30.4%). Painters, bridge, and tunnel workers--particularly problematic.
- From 1985 – 1990, the construction industry was the most frequently cited industry sector (10.8%) for silicosis-related deaths.





## Issues (2)

- Approx 350,000 construction workers are exposed to asphalt fumes (and over 50 related organic compounds) during paving and roofing activities
- Skin disease is the second most common lost-time illness (12%). Construction workers are regularly exposed to agents that cause skins disorders such as Portland cement, solvent, epoxies, and sunlight.
- Over 1 million construction workers are involved in welding, brazing, cutting, or soldering resulting in exposures to heavy metals [i.e. Mn and Cr(VI)].



# External Factors

- Long latency periods and gradual onset of exposure effects
- Hearing conservation is not currently required by OSHA for construction
- Temporary employment with intermittent exposures
- 80% of construction businesses have fewer than 10 employees. Many lack an adequate safety and health infrastructure



# Activities

- Health effects research
- Methods development
- Exposure assessment
- Engineering and work practice interventions
- Education and training
- Standards and guideline development



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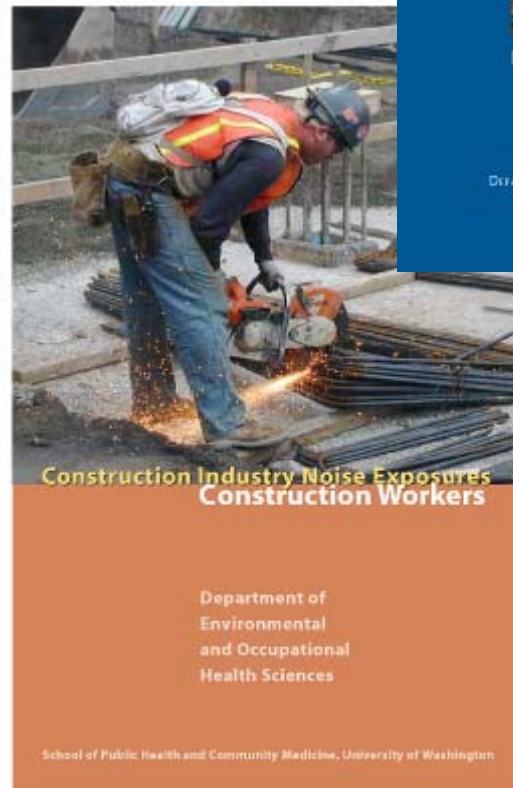


# Outputs: Noise

- 38 journal articles
- 78 conf papers/proceedings
- 15 other products



Powered hand tool database



## NOISE AND HEARING DAMAGE



## IN CONSTRUCTION APPRENTICES

UNIVERSITY OF WASHINGTON  
DEPARTMENT OF ENVIRONMENTAL AND OCCUPATIONAL HEALTH SCIENCES

SEPTEMBER 2004

Partner  
publications





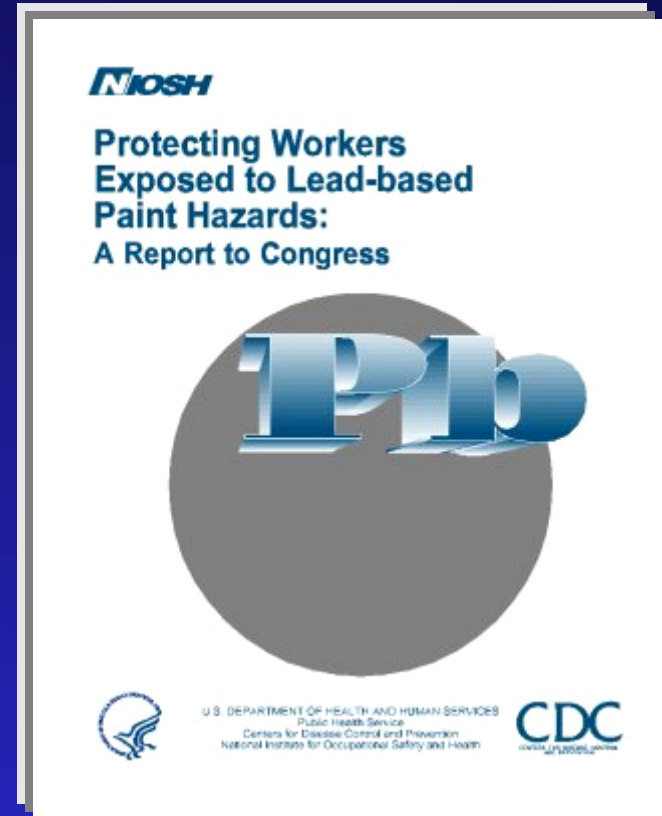
# Outputs: Noise – Programs and training materials

- Washington State: BuilditSmart Program “Blockit, Moveit, Fixit” practical solutions to reduce noise exposures
- Training videos and CDs addressing barriers to hearing protection, negative effects of tinnitus, and survey tools for assessing attitudes, beliefs, and behavioral intentions



# Outputs: Lead

- 89 journal articles, 27 technical reports and 55 conf proceedings/presentations
- Steel Structures Painting Council's Certification Program
- Patented colorimetric wipe test for lead



Publication No. 98-112. 1-800-35-NIOSH, or  
[www.cdc.gov/niosh/98-112.html](http://www.cdc.gov/niosh/98-112.html)

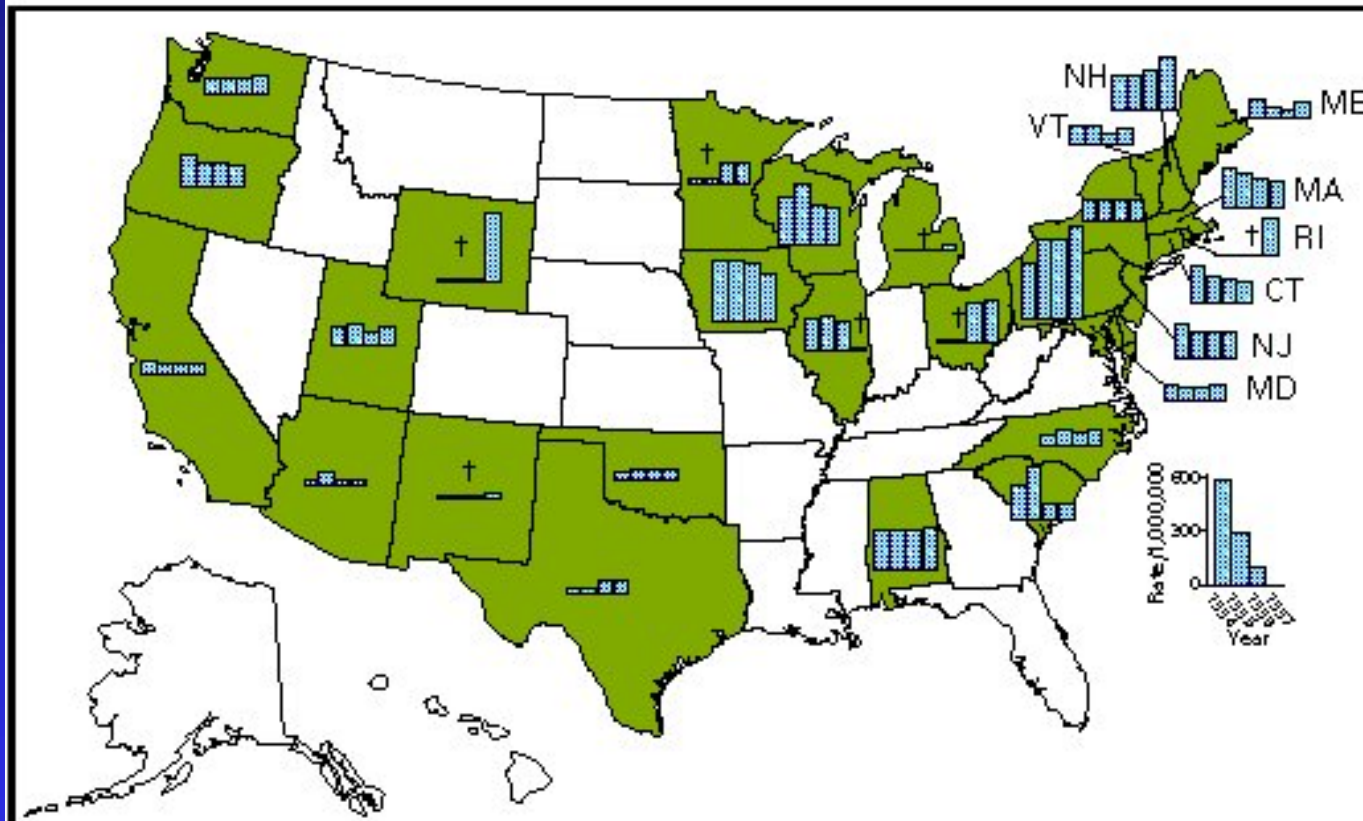


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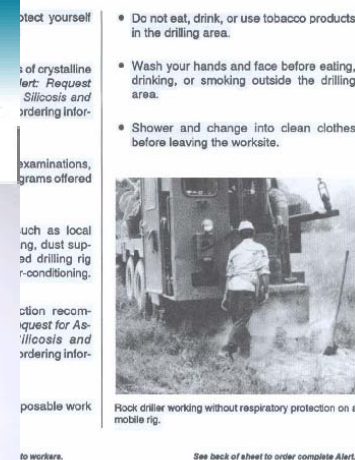
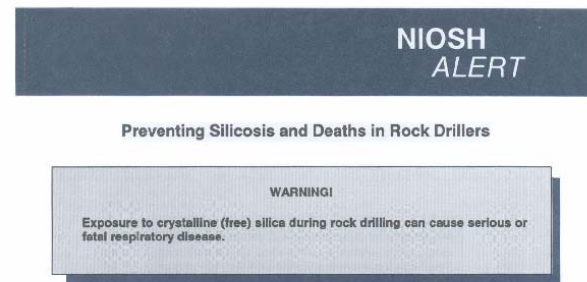
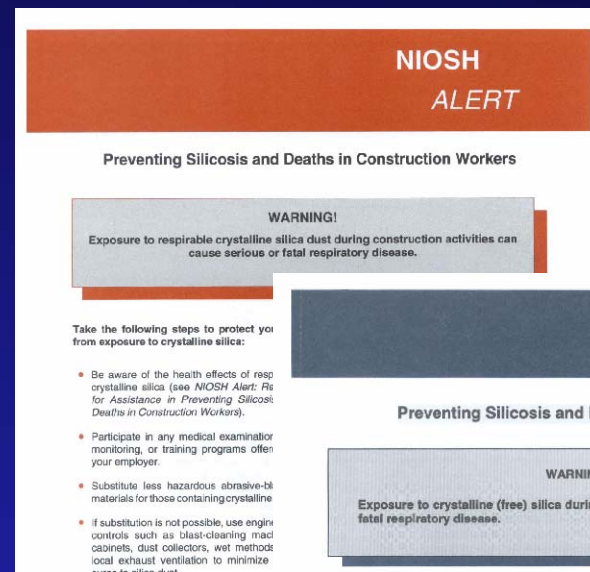
# Outputs: Lead - ABLES program

FIGURE 2. Prevalence of blood lead levels  $\geq 25$   $\mu\text{g/dL}$  among adults\*, reported by states participating in Adult Blood Lead Epidemiology and Surveillance — United States, 1994-1997



# Outputs: Silica

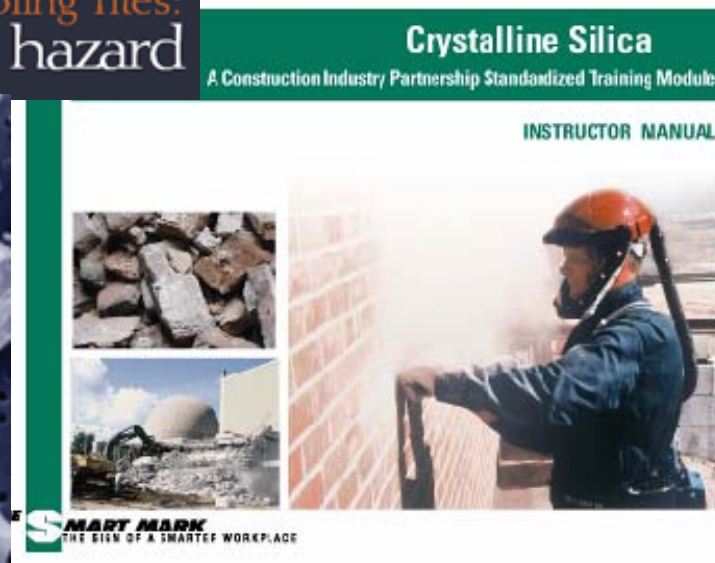
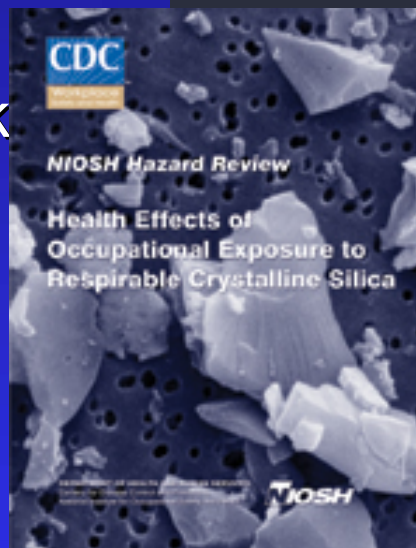
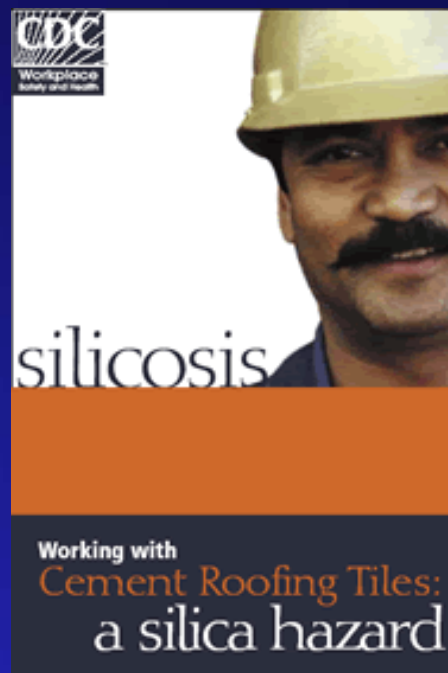
- 41 journal articles and 145 presentations/proceedings
- Silica Alert (Pub no. 96-112) in English and Spanish with approx 73,000 copies distributed
- Silica bulletin with approx 127,000 copies distributed
- Guide for Managing Silica Control Programs in Construction
- Numerous HHE and control technology (i.e. cab enclosures, substitute abrasives) reports to support OSHA Stds





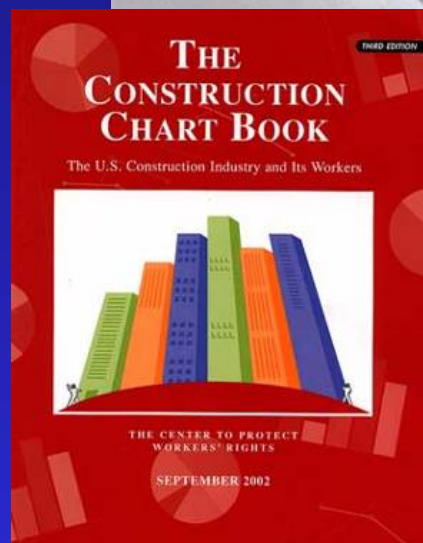
# Outputs: Silica

- Hazard Review for silica (Pub no. 2002-129) with 7,000 distributed
- Smart Mark Training manual for recognition, prevention, and control
- Analytical methods
- Engineering and work practice controls workgroup



# Outputs: Dermal

- 5 journal articles, 5 technical publications
- Approx 10,000 contact dermatitis publications
- Several hazard Alerts on solvents and construction
- Construction Chart Book contains dermal surveillance



## Professional Skin Protection

For Work with Wet Portland Cement

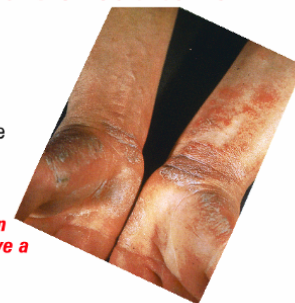
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### What Are Cement Burns?

**Cement burns are caustic burns. They are slower, sneakier, and often deeper than acid burns.**

- Alkali burns
- Blisters
- Dead, black or green skin
- Get worse without more exposure
- Severe scarring

***You cannot rely on pain to alert you to a cement burn. Cement can burn down to the bone. If you have a caustic burn, go immediately for emergency medical treatment.***



# Outputs: Welding fume

- 26 journal articles and numerous reports
- Two NIOSH methods for Cr(VI): 7605 & 7703
- Health Effects of Welding International Conf, Morgantown, WV, July 2005
- OSHA-NIOSH interagency agreement for Cr(VI) tech feasibility research
- Numerous HHEs & Control Technology reports and Journal articles on exposures and controls for welding fume



# Intermediate Outcomes: Noise

- BuilditSmart program elements adopted by:
  - ◆ OSHA, Wash St, California, & Massachusetts
- New Larson-Davis instrument for impulsive noise
- Engineering controls for drill rigs and powered hand tools
- ANSI A10.46 Hearing Loss Prevention in Construction Std and OSHA ANPR Hearing Conservation Std
- **Widely cited journal articles:**
  - ◆ Neitzel R, Seixas N, Camp J, Yost M. [1999]. An Assessment of Occupational Noise Exposure in Four Construction Trades. AIHAJ (60) 807-817. (Cited by 23)
  - ◆ Lusk SL, Kerr MJ, Kauffman SA [1998] Use of hearing protection and perceptions of noise exposure and hearing loss among construction workers AIHAJ 1998 Jul; 59(7):466-470. (Cited by 25)





# Intermediate Outcomes: Lead

- ABLES data used by state and Federal OSHA to target high risk industries
- Steel Structures Painting Council's (SSPC) Certification Program requires following OSHA Std and NIOSH Guidelines
- Construction Program lead sampling methods are cited in EPA regulations
- Construction Program work on "take-home" toxins contributed to Congress adopting lead abatement amendments to a Housing and Community Development Act



# Intermediate Outcomes: Silica

- Silica Hazard Review cited in 36 peer-reviewed pubs including HSE and ACGIH when TLV lowered.
- Analytical methods cited by AIHA, NIST & OSHA
- Smart Mark training for 40,000 workers/year
- Int'l Union of Bricklayers & Allied Crafts -- collective bargaining agreement language requires engineering controls in MI, NJ, MA
- Cab enclosure research cited in consensus standard and patent-pending environmental leakage test developed under CRADA



# Intermediate Outcomes: Welding fume

- Construction Program input into numerous ANSI Standards concerning welding fume sampling and control
- Construction Program welding research is widely used by the American Welding Society (AWS)
- NIOSH researchers have received AWS awards
- The Construction Program supported the OSHA PEL reduction for Cr(VI)



# Intermediate Outcomes: Dermal

- OPCMIA uses dermal Hazard Alert card to train 15,000 plasterers and cement workers at 80 training centers
- Construction Program dermal hazard materials available on other web sites:
  - ◆ OSHA
  - ◆ National Library of Medicine
  - ◆ Bricklayers and Allied Craftsmen
- The Laborers' Health and Safety Fund of North America (LHSFNA) use Construction Program's dermal hazard materials at 20 training centers.



WORKPLACE SAFETY AND HEALTH





# Emerging Issues

- Noise
  - ◆ Impulse noise measurement methods
  - ◆ “Buy quiet” efforts
- Lead - Color changing hand wipe intervention
- Silica
  - ◆ Support of OSHA rulemaking
  - ◆ Develop training for Building Trades Union
  - ◆ Engineering control evals-Roofing tiles



# Emerging Issues

- Asphalt -- Asphalt milling partnership is ongoing
- Dermal
  - ◆ Development of Safety and Health Guide to Working with Epoxy Resins
  - ◆ Assessment of UV exposure from welding
- Welding
  - ◆ Toxicology research on Mn/Parkinsonism
  - ◆ Evaluation of portable LEV systems

